Night Rover Challenge

Completed Technology Project (2013 - 2014)

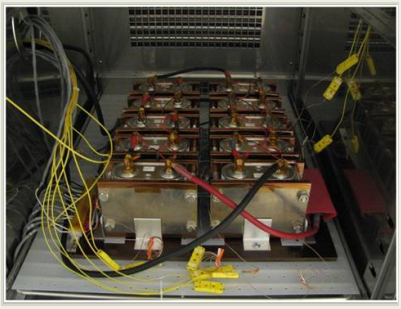
Project Introduction

The objective of the Night Rover Challenge was to foster innovations in energy storage technology. Specifically, this challenge asked competitors to create an energy storage system that could provide the power required for a lunar rover to remain continuously operational throughout at least two lunar cycles. No competitors registered for the challenge competition and the challenge was withdrawn.

Solar energy is a renewable source that would be available on the Moon and at other destinations in space. To enable practical system demonstrations of diverse design solutions by independent teams, Phase I of this Challenge will be conducted in an ambient Earth environment. Phase II will entail testing energy storage systems in NASA thermal and thermal-vacuum chambers to demonstrate applicability to the space and lunar environment. The Phase I Challenge will be to demonstrate a portable energy storage system through two cycles of lunar daylight and darkness. Phase II will be for one lunar cycle. During the daylight period, systems will receive electrical energy from a simulated solar collector. During darkness, the stored energy will be used for simulated thermal management, scientific experimentation, communications, and rover movement. The competitors may store and extract the energy by any means they desire. A winning system must exceed the performance of a reference state-of-the-art system by a specified margin. The winning system would be the one that has the highest energy storage density. The available prize purse is $1.5 million. Completing this Challenge could enable: development of mobile systems to collect solar energy, store that energy, and later use it productively; innovations in energy storage technology for space operations and, in particular, to meet the demands imposed by the daylight/darkness cycle on the Moon; and dual-use energy system innovations to benefit terrestrial applications, including vehicles and renewable energy generation systems.

Anticipated Benefits

This Challenge could lead to innovations in energy storage technologies of value in extreme space environments and in renewable energy systems on Earth.



Project Image Night Rover Challenge

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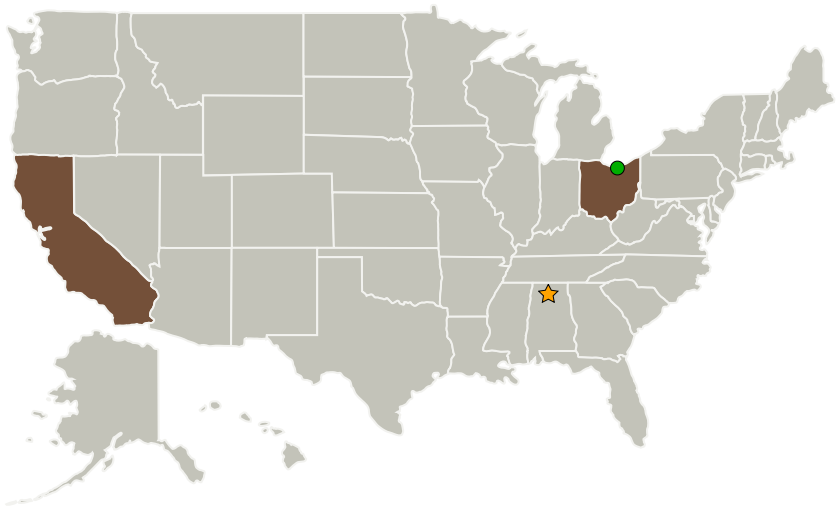

Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Cleantech Open	Supporting Organization	Industry	
●Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Co-Funding Partners	Type	Location
Cleantech Open	Industry	

Primary U.S. Work Locations	
California	Ohio

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Prizes, Challenges, and Crowdsourcing

Project Management

Program Director:

Amy P Kaminski

Program Manager:

Monserrate C Roman

Project Manager:

Samuel A Ortega

Principal Investigator:

Josh Neubert

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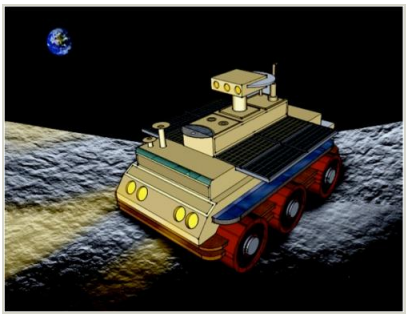
Images



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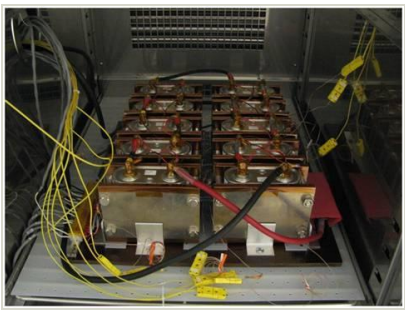
Project Image Night Rover Challenge
(https://techport.nasa.gov/image/1230)



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Project Image Night Rover Challenge
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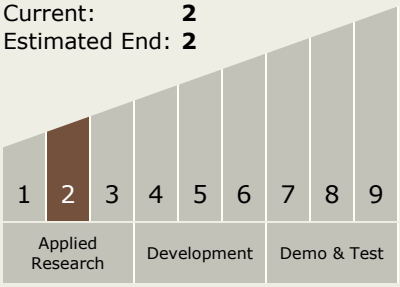
Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **2**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.3 Advanced Concepts for Energy Storage